

Theory of Neural Group Selection

Neural Group Selection

The theory of neural group selection is based on non-genetic Darwinism. This is a controversial concept because many assume that genetic selection is the only way that Darwinism can express itself. Dr. Edelman received a Nobel Prize for his work on non-genetic Darwinism in the Human Immune System. His Theory of Neural Group Selection, is an attempt to transfer the concepts from his work on the immune system into Neuro-Science.

TNGS as this theory is called, contains a number of controversial concepts, The concept of Group Selection, and the concept of reentry. The idea is simple, by themselves the connections at the individual neurons are too individualized to form a mappable network. At the neural group level however, groups of neurons are interchangeable which means that any place-code developed naturally would be idiosyncratic to the individual, and arbitrary. This is overcome according to Dr. Edelman by feedback/feedforward signals called reentry between neural groups resulting in self-organization that favors the locations of communication links and the relative size of the neural groups, as selective factors in determining where particular functions can be found. As a result of this self-organization, fuzzy classifications are formed that tend to put the same general functions in the same general areas of the cerebral cortex.

It is important to note that while some self-organization is practical, non-genetic Darwinism does not adequately map memories to areas of the cerebral cortex and therefore a place code based on the natural classification system will still be arbitrary to the individual. It is only at the gross organization level that the cerebral cortex becomes mappable across members of the same species, let alone members of different species.

One of the criticisms of Dr. Edelman's work is that he tends to try to take this organizational capability too far and tries to use reentry to map locations outside the cerebral cortex where much less connectivity is to be expected.

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